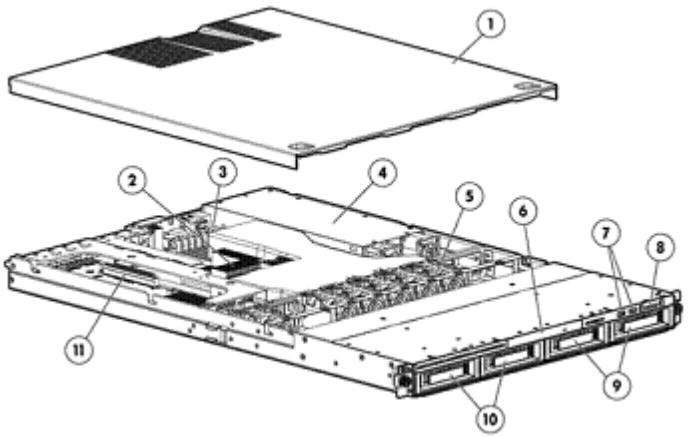
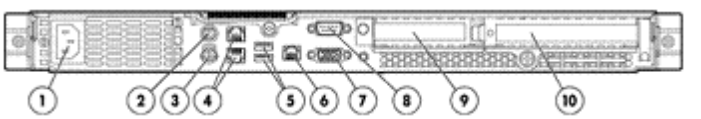
Overview

Hot Plug SAS/SATA and Non-Hot Plug SATA Models





Front View:

1. Access panel
2. Quad-Core Intel® Xeon® 5400 series processors (supports up to two)
3. Eight PC2-5300 (DDR2-667) fully buffered DIMM memory slots
4. Power supply (650 Watts)
5. System fans
6. Optional CD-RW or DVD-ROM drive
7. Two USB ports
8. Power on/off & system LEDs
9. Optional 3rd and 4th 3.5″ Non-Hot plug SATA or hot plug SAS/SATA hard drive bays
10. Standard 1st and 2nd 3.5″ Non-Hot plug SATA or hot plug SAS/SATA hard drive bays
11. Expansion Slots:
    Non-Hot Plug Models – Two available x16 PCI-Express Gen2 slots
    Hot Plug Models – One available x16 PCI-Express slot Gen2 slot

Rear View:

1. Power Supply Cable Socket
2. PS/2 Mouse Port
3. PS/2 Keyboard Port
4. Two GbE LAN ports for NIC 1 and NIC 2 (RJ-45)
5. Rear USB ports
6. LO100i 10/100 Mbps LAN port for IPMI management (RJ-45)
7. Video Port
8. Serial Port
9. Low-Profile PCI Express x8/PCI-X riser board slot cover
10. Standard height/full-height PCI Express x16/PCI-X riser board

What's New

- Support for up to two Intel® Dual-Core L5240 processor
- New PC2-6400 (DDR2-800) and low power memory options

At A Glance

The HP ProLiant DL160 G5 server is an affordable 1U, dual processor capable server equipped with essential performance features that provide customers with a platform to design a fully optimized solution. It is ideal for general purpose and high performance computing.

- Processors:

Overview

- Supports up to two Intel® Quad-Core 5400 or Dual-Core 5200 sequence processors
  - Quad-Core Intel® Xeon® processors 5400 sequence with 12 MB Level 2 cache
  - Dual-Core Intel® Xeon® processors 5200 sequence with 6 MB Level 2 cache
- Intel® 5400 Chipset

- Memory:
  - Supports up to 32 GB PC2-5300 fully buffered DIMMs (DDR2-667) with Advanced ECC
- Internal Drive Support:
  - Support for up to four 3.5" Non-Hot plug serial ATA (SATA) 3.5" hard drives; or
  - Support for up to four 3.5" Hot plug Serial Attached SCSI (SAS) or SATA hard drives.
    NOTE: Installation of the Hot Plug Backplane 1U 2S Kit (445985-B21) is required if ordering third or fourth Hard Drives for Hot Plug models only.
  - Internal storage capacity of up to 3.0TB (4 x 750GB Hot Plug 3.5" SATA), 2 TB (4 x 500 Non-Hot Plug SATA) or 1.20TB (4 x 300 GB Hot Plug 3.5" SAS)
- Network Controller:
  - Two embedded NC105i PCIe Gigabit Server Adapters
- Storage Controllers:
  - Non-Hot Plug SATA Models: HP Embedded SATA RAID Controller
  - Hot Plug SAS/SATA Models : HP SC40Ge 4-Port Internal SAS HBA with RAID 0, 1
- Expansion Slots:
  - Non-Hot Plug Models: Two available PCI Express 2.0 slots:
    - Slot 1: full-length/full-height PCI-Express 2.0 x16
    - Slot 2: low-profile/half-height PCI-Express 2.0 x16
  - Hot Plug Models: One available PCI-Express slot:
    - Slot 1: full-length/full-height PCI-Express 2.0 x16
    - Slot 2: low-profile/half-height PCI-X slot populated by the SAS/SATA storage controller
- Management:
  - HP Lights Out 100i Advanced and Select Remote Management with new licensed key activated upgrades for Virtual KVM and virtual media support. LO100i management support for the DL160 G5 includes:
  - IPMI 2.0 & SMASH CLP support
  - ROM Setup Utility
  - Improvements to virtual media with the addition of USB 2.0 drives and protocol support for much faster transfer speeds and DVD-ROM support plus simplified virtual media (floppy and CD with no FTTP server requirements)
  - Enhanced browser interface and embedded KVM over IP provides OS-independent remote graphical console
  - New Licenses that have EULAs with one-time, optional, license activation key to allow for easy, future upgrades which will be chargeable when they become available.
- USB Ports:
  - Five USB ports (two front, one internal, two rear)
- Optical Drive:
  - Support for one (optional): DVD-ROM, DVD/CD RW
- Power Supply:
  - 650W Power Supply (Non-Hot Plug, Autoswitching)
  - Optional high-efficiency model
    - NOTE: Optional high-efficiency model requires the purchase of HP Power Supply Backplane (453652-B21)
- Additional Features:
  - Support for:
    - NVIDIA Quadro FX3500 256MB PCIe graphics card
    - NVIDIA Quadro FX1500 256MB PCIe graphics card
- Form Factor:
  - Rack (1U)
  - Fixed mounting rails included with all models
- Deployment/Serviceability:
  - Tool-less access to all system components for easy in rack serviceability
- Warranty:
  - This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP

Authorized Channel Partners. Hardware diagnostic support and repair is available for one year from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Certain restrictions and exclusions apply. SATA hard drives have a one year warranty

- NOTE: Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html.

Standard Features

NOTE: For the Standard Features shipped in the Factory Integrated Models, please see the "Configuration Information - Factory Integrated Models" section.

Processor One of the following depending on Model	Quad-Core Intel® Xeon® processor X5472 (3.00GHz, 120W, 1600MHz FSB) Quad-Core Intel® Xeon® processor X5460 (3.16GHz, 120W, 1333MHz FSB) NOTE: Available through Configure To Order only. See Factory Integration Models section for more details. Quad-Core Intel® Xeon® processor L5410 (2.33GHz, 50W, 1333MHz FSB) Quad-Core Intel® Xeon® processor E5472 (3.00GHz, 80W, 1600MHz FSB) Quad-Core Intel® Xeon® processor E5462 (2.80GHz, 80W, 1600MHz FSB) Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80W, 1333MHz FSB) Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB) Dual-Core Intel® Xeon® processor X5272 (3.40GHz, 80W, 1600MHz FSB) Dual-Core Intel® Xeon® processor L5240 (3.00 GHz, 40W, TDP, 1333MHz FSB) NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.		
Upgradeability	Upgradeable to two processors		
Chipset	Intel® 5400 Chipset		
Cache Memory	12 MB (2 x 6 MB) Level 2 cache (5400 sequence) 6 MB (1 x 6 MB) Level 2 cache (5200 sequence)		
Memory Protection	Advanced ECC capabilities		
Memory	Type	PC2-5300 Fully Buffered DIMMs (DDR2-667)	
	Standard	1 GB	(2 x 512 MB)
	Maximum	32 GB	(8 x 4 GB)
Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters		

Standard Features

Expansion Slots #	Technology	Bus Width	Connector Width*	Bus Number*	Device No.**	Form Factor	Notes
1	PCI-Express 2.0	x16	x16	1	0	Full length, full height	3.3 volts
1	PCI-X***	64-bit	N/A	5	1	Full length, full height	3.3 volts
2	PCI-Express 2.0	x16	x16	6	3	Low Profile	3.3 volts
2	PCI-X***	64-bit	N/A	5	1	Low Profile	3.3 volts

NOTE: All slots can accept universal keyed PCI cards

* Default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.

** Slots are enumerated differently based on OS. MS OS's enumerate from lowest to highest Device ID by bus (starting with the lowest bus).

*** PCI-X bus speed will be 133MHz when only one PCI-X card is installed. It will be 100MHz when both slots have PCI-X cards installed.

Storage Controller	Non-Hot Plug SATA Models	HP Embedded SATA RAID Controller (integrated into the south-bridge) supporting SW RAID 0,1
	Hot Plug SATA/SAS Models	HP SC40Ge HBA with RAID 0, 1

NOTE: A diskette drive, USB floppy drive key or virtual FDD using LO100 Select or Advanced Pack is needed to install storage controller drivers during a Windows operating system installation from a CD.

Storage	**Optical Drives:**	
	DVD-ROM	8x IDE (ATAPI) DVD-ROM drive, slim (optional)
	DVD/CD RW	24x IDE (ATAPI) CD-ROM drive (optional)
	Diskette Drives	Via USB only
	Drive Bays:	
	Non-Hot Plug SATA	Up to 4 Non-hot plug SATA 3.5" drives
	Hot Plug SATA/SAS	Up to 4 Hot plug SAS/SATA 3.5" drives
	Non-Hot Plug SATA	Up to 4 Non-hot plug SATA 3.5" drives

Maximum Internal Storage	Non-Hot Plug SATA	2TB	4 x 500GB
	Hot Plug SATA	3TB	4 x 750GB
	Non-Hot Plug SAS	1.2TB	4 x 300GB
	Hot Plug SAS	1.2TB	4 x 300GB

Standard Features

Interfaces	Parallel	None
	Network RJ-45(Ethernet)	2 10/100/1000 NIC ports (plus 1 dedicated for the HP ProLiant Lights Out 100i Remote Management)
	Serial	1
	Pointing Device (Mouse)	1
	Graphics	1
	Keyboard	1
	USB	5 (two front, one internal, two rear) NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html.
Graphics	32MB shared supporting 1600x1200x16M resolution	
Form Factor	Rack (1U), (1.75 in/4.45 cm)	
Server Management Stand Alone Software Product and ProLiant Essentials	ProLiant Essentials Rapid Deployment Pack	Rapid Deployment Pack (RDP) is an automated deployment and provisioning solution for all ProLiant servers. RDP supports image capture and deployment on 100 series servers. Every RDP disc includes 10-node trial licenses for evaluation purposes. RDP requires a license for each server deployed and is available for purchase with HP servers. For more information, visit: http://www.hp.com/go/rdp. NOTE: Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. AKA Tracking licenses require a 100 unit minimum forecast at initial contract signing. For AKA and flex license part numbers, please refer to each software products' QuickSpecs at: http://www.hp.com/servers/proliantessentials or the various ProLiant Essentials Value Pack product QuickSpecs for more information.
	HP Systems Insight Manager	HP Systems Insight Manager (HP SIM) provides a unified, secure and extensible standards-based environment to centrally manage servers, storage and other infrastructure devices, (both HP and non-HP) across multiple operating system platforms.

Standard Features

Lights-Out 100i	HP Lights-Out 100i Remote Management delivers affordable, entry level remote management capabilities for HP ProLiant 100 Series servers with embedded LO100i. It allows customers or their service providers to remotely manage ProLiant 100 Series servers remotely over a LAN or the Internet and consists of the following: • LO100i Standard is embedded remote management and provides basic remote control via telnet, browser, and IPMI 2.0 and SMASH • LO100i Select Pack License are upgrades for essential, secure, remote control, serial console and virtual media • LO100i Advanced Pack License are upgrades for all the features of LO100i Select plus Virtual KVM (graphical hardware-based, remote console) NOTE: Flexible and volume quantity (AKA) license kits are available for both the Lights-Out 100i Select and Lights-Out 100 Advanced Pack licenses as well as Electronic License To Use (E-LTU). AKA Tracking licenses require a 100 unit minimum forecast at initial contract signing. For these additional part numbers, please refer to each software products' QuickSpecs at this link for more information: http://h18004.www1.hp.com/products/servers/management/remotemgmt.html.
Industry Standard Compliance	ACPI V2.0 Compliant PCI 2.2 Compliant PXE Support WOL Support Microsoft® Logo certifications IPMI 2.0, SMASH CLP compliant
Manageability	HP Lights-Out 100i Standard provides the following OS-independent remote control capabilities: • Virtual power • System event log access • System health • Remote serial console (serial redirection) • Browser, Telnet access • SMASH-CLP compliant • IPMI 2.0 compliant HP Lights-Out 100i Select Pack provides license key activated upgrades to the following: • Virtual media (Floppy and CD) • Secure Socket Layer Encryption • Secure Shell Encryption HP Lights-Out 100i Advanced Pack provides license key activated upgrades to the following: • Virtual KVM (KVM over IP functionality embedded on the system board) plus all of the LO100i Select Pack features above.

Standard Features

Security	Power-on password Setup password
Server Power Cords	One 6' Highline (IEC-IEC) power cord ships standard NOTE: HP ProLiant DL servers no longer ship standard with NEMA power cords (163719-002) that allow connection to 110V US wall outlets in a home or office. ProLiant DL servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant DL server using a 110V receptacle (NEMA-15), the NEMA power cord (227099-001) must be ordered separately. If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.
UPS and PDU Power Cord Matrix	Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units: http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html.
Power Supply	650 Watts, auto-switching, PFC (Power Factor Correcting) NOTE: Factory upgradeable to high-efficiency (HE) power supply for lower TCO
System Fans	6 system fans ship standard; Non-hot plug, Non-redundant
OS Support	Microsoft Windows 2003 and Microsoft Windows 2003/R2 Standard Edition (32-bit) Microsoft Windows 2003 and Microsoft Windows 2003/R2 Enterprise Edition (32-bit) Microsoft Windows 2003 and Microsoft Windows 2003/R2 Web Edition (32-bit) Microsoft Windows 2003 and Microsoft Windows 2003/R2 for Extended Systems Standard Edition (64-bit) Microsoft Windows 2003 and Microsoft Windows 2003/R2 for Extended Systems Enterprise Edition (64-bit) Microsoft Windows Server 2008 Red Hat Enterprise Linux SUSE Linux Enterprise Server Solaris 10 NOTE: For more complete and up-to-date information of all supported OSes for ProLiants, certification information and how to buy server operating systems from HP please visit the OS product site at: http://h18004.www1.hp.com/products/servers/software/OEM.html. NOTE: For an up-to-date listing of the latest software and drivers available for your server, please select your server: http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?lang=en&cc=us&taskId=135&prodTypeId=15351&prodCatId=241435.

Standard Features

Rack Airflow Requirements

Rack 10000 series Cabinets

The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.

CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches)

CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: www.hp.com/servers/dl160.

Rack Support

The DL Fixed Rail System supports installation in racks with square or round mounting holes (including Compaq/HP 7000, 9000, 10000 and HP series), with an adjustment range of 24" - 36". Installation into Telco 2 post, and 4 post, or threaded holes racks requires a 3rd party option kit. For additional information, please visit: www.racksolutions.com.

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express.

HP Enterprise Configurator

The HP eCo-Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance.

Standard Features

Service and Support

HP Care Pack Services provide total care and support expertise with committed response designed to meet your IT and business needs.

HP Care Pack Services provide total care and support expertise with committed response designed to meet your IT and business needs.

HP Care Pack services include coverage for the HP branded hardware options qualified for the server that are purchased at the same time or afterward and internal to the enclosure. It also includes the 22" and smaller external monitors and tower UPS options up to 3kVA. These items will be covered at the same service level and for the same coverage period as the server. Coverage of UPS Battery is not included and standard warranty terms & conditions apply. For servers or storage systems installed within a rack, service also covers all HP qualified rack options installed within the same rack.

To fully capitalize on your HP ProLiant servers' capabilities requires a service partner who thoroughly understands your server technology and systems environment. HP Services, an industry leader in provision of multi vender support solutions provides a range of support services designed to meet the varying needs of business. Whether an SMB or large global corporation HP has a ProLiant server support offer to help you speedily deploy and maximize system uptime.

Recommended Service – Simplify ProLiant solution implementation, maintenance and management.

- Support Service – 3 Year, 9x5 Next Business Day coverage, excluding HP holidays only
- Deployment Service – Hardware Installation only

Enhanced Service – Optimize service level to increase IT performance and availability

- Support Service – 3 Year 13x5 Same Business Day, 4-Hour response coverage
- Deployment Service – Installation and Start-up only

Installation & Start-Up of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays.

For a complete listing of service offerings and information visit:
http://www.hp.com/services/proliantservices
http://www.hp.com/go/proliant/carepack

HPC Interconnects

NOTE: High Performance Computing (HPC) interconnect technologies are available for the DL160 G5 under the Cluster Platform product portfolio. These high-speed interconnects are fully supported by HP when they are part of these configure to order clusters. Solutions can be defined with a lot of flexibility with the help of configuration tools. Please visit the following URL to configure HPC Clusters with InfiniBand, Gigabit Ethernet or Myrinet Interconnects: http://www.hp.com/techservers/clusters/ucp/index.html

HPC Interconnects	InfiniBand	PCI-X and PCI-Express adapters
	Gigabit Ethernet	Use embedded ports
	Myrinet XP	PCI-X Rev D, Rev E and Rev F adapters

Non Hot Plug Serial ATA (SATA) Models

HP DL160 G5 X5472 Non-Hot Plug SATA, 2GB, (1P) 445198-001 HP DL160 G5 E5430 Non-Hot Plug SATA, 1GB, (1P) 445197-001 HP DL160 G5 E5405 Non-Hot Plug SATA, 1GB, (1P) 445196-001	Processor(s) One of the following depending on model	(1) Quad-Core Intel® Xeon® processor X5472 (3.00GHz, 120W, 1600 MHz FSB) (1) Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80W, 1333MHz FSB) (1) Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2 cache
	Memory One of the following depending on model	2GB (2 x 1GB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC (X5472 models) 1GB (2 x 512MB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC (E5430, E5405 models)
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Storage Controller	HP Embedded SATA RAID Controller
	Hard Drive	160GB NHP SATA HDD
	Internal Storage	2TB maximum (4 x 500GB Non-Hot plug 3.5" SATA hard drives)
	Optical Drive	Optional CD/DVD-ROM, DVD/CD RW
	Form Factor	Rack (1U)

Hot Plug Serial ATA (SATA)/Serial Attached SCSI (SAS) Models

HP DL160 G5 X5472 Hot Plug SAS/SATA, 2GB, (1P) 445204-001 HP DL160 G5 E5430 Hot Plug SAS/SATA, 1GB, (1P) 445203-001 HP DL160 G5 E5405 Hot Plug SAS/SATA 1GB, (1P) 445202-001	Processor(s) One of the following depending on model	(1) Quad-Core Intel® Xeon® processor X5472 (3.00GHz, 120W, 1600 MHz FSB) (1) Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80W, 1333MHz FSB) (1) Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2 cache
	Memory One of the following depending on model	2GB (2 x 1GB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC (X5472 models) 1GB (2 x 512MB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC (E5430, E5405 models)
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Storage Controller	HP SC40Ge SAS HBA with RAID
	Hard Drive	None ship standard (up to 4 Hot Plug SATA or SAS drives supported)
	Internal Storage	3TB max. (4 x 750GB Hot Plug 3.5" SATA hard drives) or 1.2TB (4 x 300GB Hot Plug 3.5" SAS hard drives)
	Optical Drive	Optional CD/DVD-ROM, DVD/CD RW
	Form Factor	Rack (1U)

Smart Buys

The ProLiant Smart Buy program offers a collection of promotional server and option products that are configured with SMB in mind, offered at discounted prices, and positioned for quick delivery. Smart Buy server offers are available for a limited time only.

S-BUY DL160G5 E5405 NHP 481179-001	**Processor(s)**	(1) Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2 cache
	Memory	1GB (2 x 512MB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Storage Controller	HP Embedded SATA RAID Controller
	Hard Drive	(2) 160GB NHP SATA HDD
	Internal Storage	Up to 2TB maximum (4 x 500GB Non-Hot plug 3.5" SATA hard drives)
	Optical Drive	DVD/CD-RW
	Server Management	HP Lights-Out 100i Standard
	Form Factor	Rack Mount (1U)

S-BUY DL160G5 E5430 2P 481180-001	**Processor(s)**	(2) Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2 cache
	Memory	2GB (2 x 1GB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Storage Controller	Smart Array E200/128 BBWC Controller
	Hard Drive	None ship standard (up to 4 Hot Plug SATA or SAS drives supported)
	Internal Storage	3TB max. (4 x 750GB Hot-Plug 3.5" SATA hard drives) or 1.2TB (4 x 300GB Hot-Plug 3.5" SAS hard drives)
	Optical Drive	DVD/CD RW
	Server Management	HP Lights-Out 100i Standard
	Form Factor	Rack Mount (1U)

S-BUY DL160G5 E5462 2P 481181-001	**Processor(s)**	(2) Quad-Core Intel® Xeon® processor E5462 (2.80GHz, 80W, 1600MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2 cache
	Memory	4GB (2 x 2GB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Storage Controller	Smart Array E200/128 BBWC Controller
	Hard Drive	None ship standard (up to 4 Hot Plug SATA or SAS drives supported)
	Internal Storage	3TB max. (4 x 750GB Hot-Plug 3.5" SATA hard drives) or 1.2TB (4 x 300GB Hot-Plug 3.5" SAS hard drives)
	Optical Drive	DVD/CD RW
	Server Management	HP Lights-Out 100i Standard
	Form Factor	Rack Mount (1U)

Smart Buys

S-BUY DL160G5 E5430 AM852A	Processor(s)	(1) Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2 cache
	Memory	2GB (2 x 1GB) PC2-5300 DDR2 fully buffered DIMMs (667MHz) with Advanced ECC
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Storage Controller	HP Smart Array E200/128 BBWC Controller
	Hard Drive	None ship standard (up to 4 Hot Plug SATA or SAS drives supported)
	Internal Storage	3TB max. (4 x 750GB Hot-Plug 3.5" SATA hard drives) or 1.2TB (4 x 300GB Hot-Plug 3.5" SAS hard drives)
	Optical Drive	DVD/CD-RW
	Server Management	HP Lights-Out 100i Standard
	Form Factor	Rack Mount (1U)

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.
NOTE: HP does not allow factory integration of options into standard models listed above. Configure-to-order servers must start with a CTO Chassis.
NOTE: This product offering does not support HP Factory Express Server Configuration Level 1.
NOTE: FIO indicates that this option is a Factory Installable Option.

Step 1: Base Configuration (choose one of the following configurable models)

Non-Hot Plug Model

HP ProLiant DL160 G5 Non- Hot Plug SATA Rack CTO Chassis 445192-B21

Factory Integrated Model ships with:

Two embedded NC105i PCIe Gigabit Server Adapters (WOL & PXE-capable)
Two available PCI-Express 2 slots:

Slot 1: full-length/full-height
Slot 2: low-profile/half-height
650 Watt Power Supply
One Highline IEC Power Cord
6 Non-Hot Plug Fans
Rack (1U), (1.75 in / 4.45 cm)
Fixed Rails

Hot Plug Model

HP ProLiant DL160 G5 Hot Plug SAS/SATA Rack CTO Chassis 445193-B21

Factory Integrated Model ships with:

Two embedded NC105i PCIe Gigabit Server Adapters (WOL & PXE-capable)
Two available PCI-Express 2 slots:

Slot 1: full-length/full-height
Slot 2: low-profile/half-height
650 Watt Power Supply
One Highline IEC Power Cord
6 Non-Hot Plug Fans
Rack (1U), (1.75 in / 4.45 cm)
Fixed Rails

Configuration Information - Factory Integrated Models

Step 2: Choose Required Options (only one of the following from each list unless otherwise noted)

Base Processors	Quad-Core Intel®Xeon® processor X5472 (3.00GHz, 120W, 1600MHz FSB), FIO	462465-L21
	Quad-Core Intel® Xeon® processor X5460 (3.16GHz, 120W, 1333MHz FSB), FIO	446085-L21
	Quad-Core Intel® Xeon® processor L5410 (2.33GHz, 50W, 1333MHz FSB), FIO	448369-L21
	Quad-Core Intel® Xeon® processor E5472 (3.00GHz, 80W, 1600MHz FSB), FIO	448365-L21
	Quad-Core Intel® Xeon® processor E5462 (2.80GHz, 80W, 1600MHz FSB), FIO	463076-L21
	Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80 W, 1333 MHz FSB), FIO	446079-L21
	Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB), FIO	446077-L21
	Dual-Core Intel® Xeon® processor X5272 (3.40GHz, 80W, 1600MHz FSB), FIO	448371-L21
	Dual-Core Intel® Xeon® processor L5240 (3.00 GHz, 40W, 1333MHz FSB), FIO	448373-L21
Memory	1 GB FBD PC2-5300 2 X 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 X 1 GB Kit	397411-B21
	4 GB FBD PC2-5300 2 X 2 GB Kit	397413-B21
	8 GB FBD PC2-5300 2 X 4 GB Kit	397415-B21
	Dual Rank	
	4 GB FBD PC2-6400 800MHz 2 x 2 GB Kit	484060-B21
	8 GB FBD PC2-6400 2 x 4 GB Kit	484062-B21
	Low Power	
	2 GB FBD PC2-5300 2 X 1 GB Low Power Kit	461826-B21
	4 GB FBD PC2-5300 2 x 2 GB Low Power Kit	461828-B21
	8 GB FBD PC2-5300 2 x 4 GB Low Power Kit	466440-B21
Hard Drive (only required if 445192-B21 is selected in Step 1)	**Serial-ATA (SATA) Non-Hot Plug Hard Drives**	
	NOTE: A minimum of one hard drive required when purchasing Non-Hot Plug CTO Chassis Model (P/N 445192-B21).	
	NOTE: SATA Non-Hot Plug Hard Drives to be used with Non-Hot Plug CTO Chassis Models Only).	
	HP 80GB 1.5G SATA 7.2K NHP 3.5" HDD	383410-B21
	HP 160GB 1.5G SATA 7.2K NHP 3.5" HDD	411275-B21
	HP 250GB 1.5G SATA 7.2K NHP 3.5" HDD	411276-B21
	HP 500GB 1.5G SATA 7.2K NHP 3.5" HDD, FIO*	404469-B21
	* Factory Integrated Only	
Hot Plug HDD Backplane Option	Hot Plug HDD Backplane 1U 2S Kit	445985-B21
	NOTE: Installation of the Hot Plug Backplane 1U 2S Kit (445985-B21) is required if ordering third or fourth Hard Drives for Hot Plug models only.	

Configuration Information - Factory Integrated Models

Storage Controllers (only required if 445193-B21 is selected in Step 1)	NOTE: A minimum of one SAS Controller is required when purchasing Hot Plug CTO Chassis Model (P/N 445193-B21).	
	HP SC44Ge Host Bus Adapter	416096-B21
	HP SC40Ge 4 Internal PCIe SAS RAID Half Height HBA, FIO NOTE: Recommended HBA when purchasing Hot Plug CTO Chassis Model (P/N 445193-B21).	449363-B21
	HP Smart Array E500/256MB Controller with Battery, FIO NOTE: Customers can only order one Smart Array E500/256MB Controller and one Battery-backed write cache upgrade (P/N 383280-B21) for the HP ProLiant DL160 G5 server based on battery space.	462105-B21
	HP Smart Array E200/128 BBWC Controller	411508-B21

Step 3: Choose Additional Factory Integratable Options (only one of the following from each list unless otherwise noted)

Power Supply	HP High Efficiency Power Supply 1200W Kit, FIO NOTE: Selection of the HE Power Supply Unit will remove the 650 Watt standard power supply and requires the purchase of Power Supply Backplane (p/n 453652-B21)	453650-B21
	HP Power Supply Backplane, FIO NOTE: This backplane must be ordered with the 1200W power supply (P/N 453650-B2).	453652-B21

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Options" section below. Some options may not be available for factory integration. Please contact an HP sales representative for additional information.

Server Management Stand Alone Software Product and ProLiant Essentials

NOTE: Electronic licensing options are available for Insight Control suites and select ProLiant Essentials software products. Please see the appropriate Insight Control and ProLiant Essentials QuickSpecs for additional information.

DEPLOY

Rapid Deployment Pack

ProLiant Essentials Rapid Deployment Pack No Media 1-Server License including 1 year of 24x7 Technical Support and Updates — 452151-B21

NOTE: This license allows 1 server to be deployed and managed via RDP. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.

NOTE: For additional ProLiant Essentials Rapid Deployment Pack License Kits please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/11053_na/11053_na.html

NOTE: Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to: http://www.hp.com/servers/proliantessentials or the various ProLiant Essentials Value Pack product QuickSpecs for more information.

NOTE: For more information regarding ProLiant Essentials Software, please see the following URL: http://www.hp.com/servers/proliantessentials.

Control

NOTE: Electronic licensing options are available for Insight Control suites and select ProLiant Essentials software products. Please see the appropriate Insight Control and ProLiant Essentials QuickSpecs for additional information.

Lights-Out 100i Select Pack

HP Lights Out 100i Select Pack, No Media, 1-Server License — 455339-B21

NOTE: Supports HP ProLiant DL 160 G5, DL165 G5 and DL180 G5 servers.

Lights-Out 100i Advanced Pack

HP Lights Out 100i Advanced Pack, No Media, 1-Server License — 455342-B21

NOTE: Supports HP ProLiant DL 160 G5, DL165 G5 and DL185 G5 servers.

NOTE: Flexible and volume quantity (AKA) license kits are available for both the Lights-Out 100i Select and Lights-Out 100 Advanced Pack licenses as well as Electronic License To Use (E-LTU). AKA Tracking licenses require a 100 unit minimum forecast at initial contract signing. For these additional part numbers, please refer to each software products' QuickSpecs at this link for more information: http://h18004.www1.hp.com/products/servers/management/remotemgmt.html.

Options

Processor	Quad-Core Intel® Xeon® processor X5472 (3.00GHz, 120W, 1600MHz FSB)	462465-B21
	Quad-Core Intel® Xeon® processor X5460 (3.16GHz, 120W, 1333MHz FSB) Option Kit	446085-B21
	Quad-Core Intel® Xeon® processor L5410 (2.33GHz, 50W, 1333MHz Front Side Bus)	448369-B21
	Quad-Core Intel® Xeon® processor E5472 (3.00GHz, 80W, 1600MHz FSB) Option Kit	448365-B21
	Quad-Core Intel® Xeon® processor E5462 (2.80GHz, 80W, 1600MHz FSB)	463076-B21
	Quad-Core Intel® Xeon® processor E5430 (2.66GHz, 80W, 1333MHz FSB) Option Kit	446079-B21
	Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB) Option Kit	446077-B21
	Dual-Core Intel® Xeon® processor X5272 (3.40GHz, 80W, 1600MHz FSB)	448371-B21
	Dual-Core Intel® Xeon® processor L5240 (3.00 GHz, 40W, 1333MHz FSB)	448373-B21
Memory	1 GB FBD PC2-5300 2 X 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 X 1 GB Kit	397411-B21
	4 GB FBD PC2-5300 2 X 2 GB Kit	397413-B21
	8 GB FBD PC2-5300 2 X 4 GB Kit	397415-B21
	Dual Rank	
	4 GB FBD PC2-6400 2 X 2 GB Dual Rank Kit	484060-B21
	8 GB FBD PC2-6400 2 x 4 GB Dual Rank Kit	484062-B21
	Low Power	
	2 GB FBD PC2-5300 2 X 1 GB Low Power Kit	461826-B21
	4 GB FBD PC2-5300 2 x 2 GB Low Power Kit	461828-B21
	8 GB FBD PC2-5300 2 x 4 GB Low Power Kit	466440-B21
Hard Drives	**Serial-ATA (SATA) Non-Hot Plug Hard Drives** (Non-Hot Plug Models Only)	
	HP 80GB 1.5G SATA 7.2K NHP 3.5" HDD	383410-B21
	HP 160GB 1.5G SATA 7.2K NHP 3.5" HDD	411275-B21
	HP 250GB 1.5G SATA 7.2K NHP 3.5" HDD	411276-B21
	NOTE: When purchasing systems with the 500GB Non-Hot Plug SATA drives, please reference the Configuration Information Section of this QuickSpecs to order via Configuration to Order.	
	Serial-ATA (SATA) Hot Plug Hard Drives (SAS/SATA Hot Plug Models Only)	
	NOTE: A SAS HBA or Array Controller is required.	
	HP 160GB SATA 7.2K Hot Plug 3.5" HDD	349238-B21
	HP 250GB SATA 7.2K Hot Plug 3.5" HDD	349239-B21
	HP 500GB SATA 7.2K Hot Plug 3.5" HDD	395473-B21
	HP 750GB SATA 7.2K Hot Plug 3.5" HDD	432341-B21
	NOTE: SATA hard drives have a 1-year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/11940_na/11940_na.html (Worldwide)	

Options

	Serial-Attached SCSI (SAS) Hot Plug Hard Drives (SAS/SATA Hot Plug Models Only)	
	HP 72GB 3G SAS 15K 3.5" DP HDD	384852-B21
	HP 72GB 3G SAS 15K 3.5" SP HDD	375870-B21
	HP 146GB 3G SAS 15K 3.5" DP HDD	384854-B21
	HP 146GB 3G SAS 15K 3.5" SP HDD	375872-B21
	HP 300GB 3G SAS 15K 3.5" DP HDD	416127-B21
	HP 300GB 3G SAS 15K 3.5" SP HDD	431944-B21
	NOTE: The purchase of SAS HBA or array controller is required.	
	NOTE: Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html (Worldwide)	
Hot Plug HDD Backplane Option	Hot Plug HDD Backplane 1U 2S Kit	445985-B21
	NOTE: Installation of the Hot Plug Backplane 1U 2S Kit (445985-B21) is required if ordering third or fourth Hard Drives for Hot Plug models only.	
Graphic Cards	HP Nvidia FX1500 Kit	435703-B21
	HP Nvidia FX3500 Kit	435681-B21
	NOTE: Graphic cards are supported on Windows 2003 and Linux Operating Systems.	
Optical Drives	DVD-ROM Drive	447889-B21
	DVD/CD RW Drive	447891-B21
Storage Controllers	SAS HBA	
	HP 8 Internal Port SAS HBA with RAID	347786-B21
	NOTE: For use with Hot Plug SAS/SATA models.	
	NOTE: The selection HP 8 Internal Port SAS HBA with RAID requires the purchase of the LowProfile PCI-X Riser Option kit (P/N 452698-B21)	
	HP SC44Ge Host Bus Adapter	416096-B21
	NOTE: PCI-Express SAS HBA.	
	NOTE: Please see the following QuickSpecs additional information: http://h18004.www1.hp.com/products/quickspecs/12332_na/12332_na.html (8 Internal Port SAS HBA) http://h18004.www1.hp.com/products/quickspecs/12617_na/12617_na.html (SC44Ge HBA)	
	SCSI HBA	
	HP SC11Xe Host Bus Adapter	412911-B21
	NOTE: Please see the following QuickSpecs additional information: http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html (SC11Xe HBA)	
	SAS Controllers	
	Smart Array E200 Controller	

Options

HP Smart Array E200/128 BBWC Controller	411508-B21
NOTE: Please see the following QuickSpecs additional information: http://h18000.www1.hp.com/products/quickspecs/12460_na/12460_na.html (Smart Array E200 Controller)	
Smart Array E500 Controller	
HP Smart Array E500/256MB Controller	435129-B21
NOTE: Standard RAID 0,1, 1+0.	
NOTE: Customers can only order one Smart Array E500/256MB Controller and one Battery-backed write cache upgrade (P/N 383280-B21) for the HP ProLiant DL160 G5 server based on battery space.	
Battery-backed write cache upgrade	383280-B21
NOTE: RAID 5 Support. When installing a battery-backed write cache module, the HP Smart Array E500 must be installed in the full-length PCI slot	
NOTE: Please see the following QuickSpecs additional information: http://h18000.www1.hp.com/products/quickspecs/12700_na/12700_na.html (Smart Array E500 Controller)	
Smart Array P400 Controller	
HP Smart Array P400/256 Controller	405132-B21
NOTE: Customers can only order one Smart Array P400/256MB Controller and one Battery-backed write cache upgrade (P/N 383280-B21) for the HP ProLiant DL160 G5 server based on battery space.	
HP Smart Array P400/512 Controller with BBWC	411064-B21
NOTE: Customers can only order one Smart Array P400/512MB BBWC Controllers for the HP ProLiant DL160 G5 server based on battery space.	
512MB Battery-backed write cache upgrade	405148-B21
NOTE: Contains batter and memory module. For Smart Array P400 Controller.	
NOTE: Please see the following QuickSpecs additional information: http://h18000.www1.hp.com/products/quickspecs/12400_na/12400_na.html (Smart Array P400 Controller)	
Smart Array P800 Controller	
HP Smart Array P800/512 BBWC Controller	381513-B21
NOTE: Please see the following Controller QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12616_na/12616_na.html (Smart Array P800 Controller)	
Riser Board Kits	
HP PCI-X Riser Board Kit	445986-B21
NOTE: Replaces the standard Full Height PCI Express slot with a Full Height PCI-X slot.	
HP PCI-X L/P Riser Kit	452698-B21
NOTE: Replaces the standard Half Height (LP) PCI Express slot with a Half Height (LowProfile) PCI-X slot.	

Options

Communications	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Quad Port Gigabit Server Adapter	435508-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter NOTE: Supported on a Full Length-Full Height slot only.	394795-B21
	HP NC510C PCIe 10 Gigabit Server Adapter NOTE: A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510C adapter.	414129-B21
	HP NC510F PCIe 10 Gigabit Server Adapter NOTE: A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510F adapter.	414126-B21
HPC Specific Options	HP IB 4X DDR PCI-e Dual Port 0 Memory HCA	483513-B21
	HP IB 4X DDR Conn-X PCI-e G2 Dual Port HCA	483514-B21
	HP IB 4X DDR PCI-e DUAL PORT HCA	448397-B21
	Myrinet PCI 2XP Rev-E 4MB Network Interface Card	373983-B21
	NOTE: For HPC interconnect adapters please see the HPC Interconnect section of this QuickSpecs.	
Tape Drives	NOTE: For the complete listing of Tape Drive offerings, please see: http://www.hp.com/products1/storage/compatibility/tapebackup/iss/index.html	
	USB Tape Drives	
	HP StorageWorks 1U USB Rack-Mount Kit with one DAT 160 USB Tape Drive	AG703A
	SAS Tape Drives NOTE: For the DL160 G5, HP recommends purchasing the HP SC44Ge HBA (416096-B21) for a dedicated SAS HBA for tape.	
	HP StorageWorks DAT 160 SAS Internal Tape Drive NOTE: HP recommends combining this tape drive with the 1U SAS Rack-Mount kit (AE459A) for a complete rack-mount solution.	Q1587A
	HP StorageWorks LTO-2 Ultrium 448 SAS Internal Tape Drive NOTE: HP recommends combining this tape drive with the 1U SAS Rack-Mount kit (AE459A) for a complete rack-mount solution.	DW085A
	HP ProLiant Ultrium 920 SAS Internal Tape Drive	EH978A
	HP StorageWorks 1U SAS Rack-mount kit with one LTO-4 Ultrium 1760	EH946A
	NOTE: Please refer to the "Tape Drives, Tape Autoloaders & Tape Libraries" table in the Storage section of this document for a list of SAS controllers with tape support.	
	Ultrium Tape Drives	
	HP StorageWorks LTO-1 Ultrium 232 Internal Tape Drive (Carbonite) NOTE: HP recommends combining this tape drive with the 1U SCSI Rack-Mount kit (A7445B) for a complete rack-mount solution.	DW064A
	HP StorageWorks 1U SCSI Rack-mount kit with one LTO-2 Ultrium 448 SCSI Tape Drive (Carbonite)	DW028B
	HP StorageWorks 1U SCSI Rack-mount kit with one LTO-3 Ultrium 920	EH903A
	HP StorageWorks 3U SCSI Rack-mount kit with one LTO-3 Ultrium 960 (Carbonite)	Q1595B

Options

	HP StorageWorks 1U SAS Rack-mount kit with one LTO-4 Ultrium 1760	EH946A
	HP StorageWorks 3U SCSI Rack-Mount with 1 LTO-4 Ultrium 1840 Tape Drive	EH926A
	NOTE: Please see the HP StorageWorks LTO Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items: http://h18006.www1.hp.com/products/quickspecs/11739_na/11739_na.html http://h18006.www1.hp.com/products/quickspecs/12128_na/12128_na.html	
	For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: http://www.hp.com/go/connect	
	Rack-Mount Tape Drive Enclosures	
	HP StorageWorks 1U SCSI Rack-Mount kit	A7445B
	NOTE: The 1U Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with multiple Single-Ended and LVD SCSI tape drives including the DAT 40, DAT 72, DAT 160, DLT VS160, LTO-1 Ultrium 232, LTO-2 Ultrium 448 and LTO-3 Ultrium 920 tape drives.	
	HP StorageWorks 1U USB Rack-Mount Kit	A8007A
	NOTE: The 1U USB Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the DAT 40 USB, DAT 72 USB and DAT 160 tape drives.	
	HP StorageWorks 1U SAS Rack-Mount Kit	AE459A
	NOTE: The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS and LTO-4 Ultrium 1760 SAS tape drive.	
	HP StorageWorks 3U SCSI Rack-mount kit	274338-B22
	NOTE: The 3U SCSI Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple LVD SCSI tape drives including DAT 40, DAT 72, DAT 160, LTO-1 Ultrium 232, LTO-2 Ultrium 448, LTO-3 Ultrium 920, LTO-3 Ultrium 960 and LTO-4 Ultrium 1840 tape drives.	
	NOTE: Please see the Rack-Mount Tape Drive Kits QuickSpecs for additional information regarding these kits: http://h18000.www1.hp.com/products/quickspecs/10854_na/10854_na.html	
HP D2D Backup System	HP StorageWorks D2D110 Backup System	EH880A
	NOTE: 1TB of Disk Storage	
	HP StorageWorks D2D110 Backup System with Data Protector Express Software Kit	EH923A
	NOTE: 1TB of Disk Storage	
	HP StorageWorks D2D120 Backup System	EH884A
	NOTE: 2TB of Disk Storage	
	HP StorageWorks D2D120 Backup System with Data Protector Express Software Kit	EH924A
	NOTE: 2TB of Disk Storage	
	HP StorageWorks D2D130 Backup System	EH950A
	NOTE: 3TB of Disk Storage	
	HP StorageWorks D2D130 Backup System with Data Protector Express Software Kit	EH951A
	NOTE: 3TB of Disk Storage.	
	HP StorageWorks D2D130 Backup System with LTO-3 Ultrium 920 SAS Tape Drive	EH952A
	NOTE: 3TB of Disk Storage.	
	NOTE: Please see the HP D2D Backup Systems QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12651_na/12651_na.html	

Options

Tape Autoloaders	**HP StorageWorks DAT Autoloader**	
	HP StorageWorks DAT 72x10 tape autoloader	AE313B
	HP StorageWorks 1/8 Tape Autoloader	
	HP StorageWorks 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 Tape Autoloader	AH165A
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A
	HP StorageWorks 1/8 G2 LTO-2 Ultrium 448 Tape Autoloader	AH164A
	HP StorageWorks 1/8 G2 LTO-1 Ultrium 232 Tape Autoloader	AH163A
	HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit	AH166A
	NOTE: Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions.	
	NOTE: Please reference the Tape Autoloader QuickSpecs at http://www.hp.com/go/automation for additional information needed to create a complete solution; reference current compatibility information at: http://www.hp.com/go/ebs.	
Tape Libraries	**HP StorageWorks MSL2024 Tape Library**	
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ033A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 4GB FC Library	AJ034A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Drive Library	AK378A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 SCSI Drive Library	AG115A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 4GB FC Library	AG326B
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SCSI Drive Library	AH169A
	HP StorageWorks MSL2024 1 LTO-2 Ultrium 448 SCSI Drive Library	AG116A
	HP StorageWorks MSL4048 Tape Library	
	HP StorageWorks MSL4048 1 Ultrium 448 SCSI Drive Library	AG320A
	HP StorageWorks MSL4048 1 Ultrium 920 SAS Drive Library	AH560A
	HP StorageWorks MSL4048 1 Ultrium 920 SCSI Drive Library	AH171A
	HP StorageWorks MSL4048 1 Ultrium 960 SCSI Drive Library	AG322A
	HP StorageWorks MSL4048 1 Ultrium 960 4GB FC Library	AG324B
	HP StorageWorks MSL4048 2 LTO-4 Ultrium 1760 SAS Drive Library	AK380A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ035A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 4GB FC Library	AJ036A
HP StorageWorks Modular Smart Array 50	HP StorageWorks Modular Smart Array 50 Enclosure	364430-B21
	NOTE: Rack-mountable 10 SFF drive enclosure with single I/O module, redundant hot plug power supplies and hot plug fans.	
	NOTE: Please see the Modular Smart Array 50 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: http://h18000.www1.hp.com/products/quickspecs/12245_na/12245_na.html	

Options

HP StorageWorks Modular Smart Array 60	HP StorageWorks 60 Modular Smart Array NOTE: Rack-mountable 12-drive (3.5" 3G SAS/1.5G SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies. NOTE: Please see the Modular Smart Array 60 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: http://h18000.www1.hp.com/products/quickspecs/12627_na/12627_na.html	418408-B21
HP StorageWorks Modular Smart Array 70	HP StorageWorks 70 Modular Smart Array NOTE: Rack-mountable 25-drive (2.5" 3G SAS/1.5G SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies. NOTE: Please see the Modular Smart Array 70 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: http://h18000.www1.hp.com/products/quickspecs/12652_na/12652_na.html	418800-B21
StorageWorks Options	**StorageWorks Fibre Channel HBA** NOTE: The following is a list of all Fibre Channel Host Bus Adapters for Windows and Linux. For detailed compatibility information please see: http://h18006.www1.hp.com/storage/saninfrastructure/hba.html	
	HP StorageWorks FC2142SR 4Gb PCI-e HBA	A8002A
	HP StorageWorks FC2242SR Dual Channel 4 Gb PCI-e HBA	A8003A
	HP StorageWorks FC1142SR 4Gb PCI-e HBA	AE311A
	HP StorageWorks FC1242SR Dual Channel 4 Gb PCI-e HBA	AE312A
	HP StorageWorks FC2143 4Gb PCI-X 2.0 - to Fibre Channel HBA	AD167A
	StorageWorks SCSI HBA	
	HP U320e SCSI Host Bus Adapter NOTE: Recommended Dual Channel Ultra320 SCSI Controller for connecting multi-drive MSL tape libraries to ProLiant servers	AH627A
	HP StorageWorks FC2243 4Gb PCI-X 2.0 DC HBA	AD168A
Uninterruptible Power Systems - Rack	HP R1.5 VA 1U UPS	AF419A
	HP R/T2200 2-U ERM	AF412A
USB Options	USB 1.44-MB External Diskette Drive	DC141B
	USB Floppy Drive	DC361B
	HP USB-P/S2 Mouse	DC369A
	HP Keyboard (USB) standard 2004	DT528A#ABA
	HP USB Internal Cable Kit	451363-B21

Options

HP KVM Switch Options	2x1x16 IP Console Switch with Virtual Media	AF601A
	4x1x16 IP Console Switch with Virtual Media	AF602A
	2x16 Server Console Switch with Virtual Media	AF600A
	PS/2 Virtual Media Interface Adapter, 1 pack	AF604A
	NOTE: Requires PS/2 and one USB port on server.	
	HP Server Console Switch (KVM), 0 x 1 x 8 port	336044-B21
	HP Server Console Switch (KVM), 0 x 2 x 16 port	336045-B21
	PS/2 Interface Adapter, 1 pack	262588-B21
	PS/2 Interface Adapter, 8 pack	262587-B21
	USB Interface Adapter, 1 pack	336047-B21
	Serial Interface Adapter - 1 pack with power supply	373035-B21
	HP 1x4 Console Switch	AF611A
	HP PS2 Server Console Cable, 6 foot, 2-Pack	AF612A
	HP USB Server Console Cable, 6 foot, 2-Pack	AF613A
	NOTE: required for supporting USB peripherals.	
	NOTE: Cat5e cables are required to connect Interface Adapters to Console Switches. Cat5e cables can be found at the following URL: http://www.hp.com/go/kvm	
HP Serial Console Server Options	HP 16 Port Serial Console Server	AF101A
	HP 48 Port Serial Console Server	AF102A
	Serial Adapter, RJ45-D89 DCE Female, 1-pack	AF103A
	Serial Adapter, RJ45-D89 DCE Female, 8-pack	AF110A
	NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: http://www.hp.com/go/kvm	
Service and Support Offerings (HP Care Pack Services)	**Hardware Services 4-Hour On-site Service**	
	NOTE: To attach 3 year, 4-Hour On-site Service to Smart Buy servers, Smart Buy Care Packs must be used. For other service levels, order standard Care Pack part numbers.	
	13-Hour x 5-Day Coverage, 3 Years, Electronic	U9509E
	24-Hour x 7 Day Coverage, 3 Years, Electronic	U9510E
	NOTE: Use one of the following Smart Buy Care Packs to attach 3 year, 4-Hour On-site Service to Smart Buy servers. For other service levels, order standard Care Pack part numbers.	
	DL16x Smart Buy 4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic	UK159E
	DL16x Smart Buy 4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UK160E
	Hardware Services Next Business Day On-Site Service	
	9-Hour x 5-Day Coverage, 3 Years, Electronic	U9508E
	Hardware Services 6-Hour Call to Repair On-Site Service	
	Hardware Installation, Electronic	U9520E
	NOTE: For more information, customer/resellers can contact: http://www.hp.com/services/carepack	

Memory

HP ProLiant DL160 G5 (all models)

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".

Standard Memory

1GB (2x512MB) or 2GB (2 x 1GB) depending on model, PC2-5300 Fully Buffered DIMM memory, with Advanced ECC.

Maximum Memory

Up to 32GB memory is available with the optional installation of PC2-5300 Fully Buffered DIMM memory kits.

NOTE: Memory should be installed in pairs and matched for optimum performance.

NOTE: Chart does not represent all possible memory configurations.

Memory	Slot							
	1	2	3	4	5	6	7	8
Standard (1 GB)	512 MB	Empty	512 MB	Empty	Empty	Empty	Empty	Empty
Standard (2 GB)	1 GB	Empty	1 GB	Empty	Empty	Empty	Empty	Empty
Maximum (32 GB)	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB

Following are memory options available from HP:

1 GB FBD PC2-5300 2 X 512 MB Kit	397409-B21
2 GB FBD PC2-5300 2 X 1 GB Kit	397411-B21
4 GB FBD PC2-5300 2 X 2 GB Kit	397413-B21
8 GB FBD PC2-5300 2 X 4 GB Kit	397415-B21
Dual Rank	
4 GB FBD PC2-6400 2 X 2 GB Dual Rank Kit	484060-B21
8 GB FBD PC2-6400 2 x 4 GB Kit	484062-B21
Low Power	
2 GB FBD PC2-5300 2 X 1 GB Low Power Kit	461826-B21
4 GB FBD PC2-5300 2 x 2 GB Low Power Kit	461828-B21
8 GB FBD PC2-5300 2 x 4 GB Low Power Kit	466440-B21

1-4 Four Non-hot plug SATA or four 3.5" Hot-plug SAS/SATA hard drive bays

A Optional DVD-ROM, or DVD/CD RW

Drive Support

Removable Media

	Quantity Supported	Position Supported	Controller
DVD-ROM	Up to 1	A	Integrated IDE (ATAPI) (optional)
DVD/CD RW	Up to 1	A	Integrated IDE (ATAPI) (optional)

Hard Drives

Serial-ATA (SATA) Non-Hot Plug Hard Drives

	Quantity Supported	Position Supported	Controller
3.5-inch			
80GB 1.5G SATA7.2K 160GB 1.5G SATA 7.2K 250GB 1.5G SATA 7.2K 500GB 1.5G SATA 7.2K 750GB 1.5G SATA 7.2K	Up to 4	1-4	HP Embedded SATA RAID Controller

Serial-ATA (SATA) Hot Plug Hard Drives

NOTE: Installation of the Hot Plug Backplane 1U 2S Kit (445985-B21) is required if ordering third or fourth Hard Drives for Hot Plug models only.

	Quantity Supported	Position Supported	Controller
3.5-inch			
160GB SATA 7.2K 250GB SATA 7.2K 500GB SATA 7.2K 750GB SATA 7.2K	Up to 4	1-4	HP SC40Ge 4-Port Internal SAS HBA with RAID 0, 1 HP Smart Array P400 Controller HP Smart Array E500/256MB Controller HP Smart Array P800 Controller

Storage

Serial-Attached SCSI (SAS) Hot Plug Hard Drives

NOTE: Installation of the Hot Plug Backplane 1U 2S Kit (445985-B21) is required if ordering third or fourth Hard Drives for Hot Plug models only.

	Quantity Supported	Position Supported	Controller
3.5-inch			
72GB 3G SAS 15K 3.5" SP 146GB 3G SAS 15K 3.5" SP 300GB 3G SAS 15K 3.5" SP	Up to 4	1-4	Embedded SATA with integrated SATA RAID 0,1 HP Smart Array E200/128 BBWC Controller HP Smart Array P400 Controller HP Smart Array E500/256MB Controller HP Smart Array P800 Controller

External Storage

	Quantity Supported	Position Supported	Controller
Modular Smart Array 20 Family	Up to 2 per SA-6402 Up to 4 per SA-6404	External	Smart Array 6402/128 Controller Smart Array 6404/256 Controller Smart Array 642 Controller
Modular Smart Array 30 Family	Up to 2 per SA 6402 Up to 4 per SA 6404	External	Smart Array 6402/128 Controller Smart Array 6404/256 Controller Smart Array 642 Controller
Modular Smart Array 50 Enclosure	Up to 2	External	Smart Array 6402/128 Controller Smart Array 6404/256 Controller Smart Array 642 Controller
HP StorageWorks Modular Smart Array 60	Up to 8	External	HP Smart Array P800/512 BBWC Controller
HP StorageWorks Modular Smart Array 70	Up to 8	External	HP Smart Array P800/512 BBWC Controller

Tape Drives, Tape Autoloaders, Tape Libraries & D2D Backup

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/north_america/10233.html

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders and Tape Libraries listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/north_america/10809.html

NOTE: For complete listing of tape drive offerings see: http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html

NOTE: SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP StorageWorks SCSI Tape Drives, External LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-3 Ultrium 960 LTO-4 Ultrium 1840 DAT 40 DAT 72 DAT 160 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Host Bus Adapter	412911-B21
HP StorageWorks USB Tape Drives, External DAT 40 USB DAT 72 USB DAT 160 USB 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
HP StorageWorks SAS Tape Drives, External DAT 160 SAS LTO-2 Ultrium 448 SAS LTO-3 Ultrium 920 SAS LTO-4 Ultrium 1760 SAS LTO-4 Ultrium 1840 SAS 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter	416096-B21
HP StorageWorks SCSI Tape Automation, External DAT 72x10 Autoloader 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096 MSL6000	External	HP SC11Xe Host Bus Adapter HP U320e SCSI Host Bus Adapter NOTE: Recommended for MSL tape libraries.	412911-B21 AH627A
HP StorageWorks SAS Tape Automation, External 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP SC44Ge Host Bus Adapter NOTE: Please visit: http://www.hp.com/go/connect for details about minimum SAS controller firmware version and SAS cabling requirements.	416096-B21

Storage

HP StorageWorks Fibre Tape Automation, External MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for detailed connectivity information.	N/A
HP StorageWorks D2D Backup Systems D2D110 D2D120 D2D130	External	Embedded Network Controller	N/A

Power Specifications

Operational Input Voltage Range (Vrms)	90Vac to 264Vac full range					
Frequency Range (Nominal) (Hz)	47 Hz to 63 Hz					
Nominal Input Voltage (Vrms)	100	115	200	220	230	240
Max Rated Output Wattage Rating	653.10	653.19	653.08	652.96	653.08	652.96
Nominal Input Current (A rms)	8.55	7.31	4.12	3.77	3.6	3.46
Max Rated Input Wattage Rating (Watts)	855	840.72	824.12	827.5	806.3	805.71
Max. Rated VA (Volt-Amp)	990	990	990	990	990	990
Efficiency (%)	76.39	77.69	79.25	78.91	81	81.04
Power Factor	0.998	0.997	0.983	0.976	0.973	0.969
Leakage Current (mA)	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA
Maximum Inrush Current (A peak)	60A	60A	60A	60A	60A	60A
Maximum Inrush Current Duration (mS)	1mS	1mS	1mS	1mS	1mS	1mS

Power		
ProLiant DL160 G5 Fully Configured	115V/60Hz	220V/50Hz
Fully Loaded System Input Wattage (W)	651	638
Fully Loaded System Input Current (A rms)	5.7	3.0
Fully Loaded System Thermal (BTU- Hr)	2218	2174
Fully Loaded System VA (Volt-Amp)	657	657
System Leakage with all power supplies loaded (mA)	1.58	3.03
System Inrush Current with all power supplies loaded (A)	19	37
Power cord requirements	Nema 5-15P to IEC320-C13	IEC320-C13 to IEC320-C14
NOTE: Power shown is for a fully configured system consisting of (2) CPU, (8) double-sided DIMMs, (2) HDDs, (1) CD-ROM, and (2) PCI cards.		
Power Cord		AF556A

Server Power Cords

One 6' Highline (IEC-IEC) power cord ships standard

NOTE: HP ProLiant DL servers no longer ship standard with NEMA power cords (163719-002) that allow connection to 110V US wall outlets in a home or office. ProLiant DL servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant DL server using a 110V receptacle (NEMA-15), the NEMA power cord (227099-001) must be ordered separately.

If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.

System Unit	**Dimensions** (H x W x D) (with bezel)	1.70 x 17.64 x 26.85 in (4.32 x 44.80 x 68.20 cm)	
	Weight (approximate)	Maximum (all hard drives, power supplies, and processors installed)	37.00 lb (16.78 kg)
		Minimum (one hard drive, power supply, and processor installed)	30.00 lb (13.69 kg)
	Input Requirements (per power supply)	Rated Line Voltage	90 to 140 VAC 180 to 264 VAC
		Rated Input Current	7.31A at 115VAC 3.6A at 230VAC
		Rated Input Frequency	47 to 63 Hz
		Rated Input Power	855W (at 100 VAC), 840.72W (at 200 VAC)
	Power Specifications	To review typical system power ratings use the Power Calculator which is available via the online tool located at URL: http://h30099.www3.hp.com/configurator/calc/power%20calculator%20catalog.xls - Click on the system of interest. Example: DL160 G5 - Follow the instructions of the next screens.	
	Power Supply Output (per power supply)	Rated Steady-State Power	653.10W (at 100 VAC), 653.08W (at 200 VAC)
	System Inlet Temperature	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 305 m) above sea level to a maximum of 10,000 ft (3050 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C).
		Non-operating	40° to 140° F (-40° to 60° C) Maximum rate of change is 36°F/hr (20°C/hr).
	Relative Humidity (non-condensing)	Operating	10% to 85% relative humidity (Rh), 82.4°F (28°C) maximum wet bulb temperature, non-condensing.
		Non-operating	10% to 95% relative humidity (Rh), 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	10,000 ft (3050 m). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
		Non-operating	30,000 ft (9144 m). Maximum allowable altitude change rate is 1500 ft/min (457 m/min).

	Acoustic Noise	Listed are the declared A-Weighted sound power levels (L_{WAd}) and declared average bystander position A-Weighted sound pressure levels (L_{pAm}) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
		Idle	
		L_{WAd}	6.86
		L_{pAm}	52.36dBA
		Operating	
		L_{WAd}	6.89
		L_{pAm}	52.60dBA

Non-Hot Plug SATA Hard Drives	160-GB 7.2K 411275-B21	**Capacity**	160,041 MB	
		Height	1.028 in (2.61 cm)	
		Width	4.0 in (10.16 cm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SATA ATA	
		Transfer Rate Synchronous (Maximum)	1.5Gb/s	
		Seek Time (typical reads, including settling)	Single Track	0.9 ms
			Average	9.0 ms
			Full-Stroke	17.8 ms
			Rotational Speed	7,200 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	312,581,808
		Operating Temperature	41° to 131° F (5° to 55° C)	

Embedded NC105i PCIe Gigabit Server Adapter	Network Interface	Integrated 10/100/1000BASE-T Transceiver Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.	
	Data Transfer Method	Compliant to x1 PCIe Specification	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000Mb/s
	Connector	RJ-45 connector	
	Cable Support	Performs all the physical layer functions for 10BASE-T, 100BASE-T, and 1000BASE-T Ethemet on standard Category 5 UTP	

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.